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Indian Standard

ROAD VEHICLES — LIQUEFIED PETROLEUM GAS (LPG) SPECIFIC EQUIPMENTS — DEFINITIONS, CLASSIFICATION AND GENERAL REQUIREMENTS

ICS 43.060.40

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

August 2012 **Price Group 3**

Automotive Vehicles Running on Non-conventional Energy Sources Sectional Committee, TED 26

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Vehicles Running on Non-conventional Energy Sources Sectional Committee had been approved by the Transport Engineering Division Council.

In the formulation of this standard, considerable assistance has been derived from ECE Regulation No. 67 (Revision 2 — Amendment 2 : Supplement 8 to the 01 series of amendments: Date of entry into force: 3 February 2008) ‘Uniform provisions concerning: Part 1 Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion system’.

Following documents may be referred to for latest update on statutory requirements related to use of LPG fuel system in internal combustion engine vehicles:

a) *Central Motor Vehicle Rules*, 1989 (CMVR) (As amended from time-to-time); and
b) *Motor Vehicle Act*, 1988 (MVA) (As amended from time-to-time).

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

ROAD VEHICLES — LIQUEFIED PETROLEUM GAS (LPG) SPECIFIC EQUIPMENTS — DEFINITIONS, CLASSIFICATION AND GENERAL REQUIREMENTS

1 SCOPE

1.1 This standard specifies definitions, classification and general requirements of liquefied petroleum gas (LPG) specific equipments of motor vehicles of category L, M and N as defined in IS 14272 using LPG in their propulsion system.

1.2 This standard is applicable to LPG specific equipments intended to use on vehicles using liquefied petroleum gas, in accordance with *Central Motor Vehicles Rules*, 1989 (CMVR).

1.3 This standard is not applicable for the following:

a) Fuel containers;
b) Multi function valve assembly for permanently fixed liquefied petroleum gas (LPG) containers for automotive use; and
c) LPG specific equipments used in agricultural tractors and construction equipment vehicles.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
14272 : 2011	Automotive vehicles — Types — Terminology (*first revision*)
15100 : 2001	Multifunction valve assembly for permanently fixed liquefied petroleum gas LPG containers for automotive use

3 DEFINITIONS

For the purpose of this standard, the following definitions shall apply.

3.1 Pressure — Relative pressure *versus* atmospheric pressure, unless otherwise stated.

3.1.1 *Service Pressure* — The settled pressure at a uniform gas temperature of 15°C.

3.1.2 *Test Pressure* — The pressure to which the component is subjected during the approval test.

3.1.3 *Working Pressure* — The maximum pressure to which the component is designed to be subjected and on the basis of which its strength is determined.

3.1.4 *Operating Pressure* — The pressure under normal operating conditions.

3.1.5 *Maximum Operating Pressure* — The maximum ressure in a component which might arise during operation.

3.1.6 *Classification Pressure* — The maximum allowable operating pressure in a component according to its classification.

3.2 LPG Specific Equipment — LPG specific equipment means,

a) Container (see *Gas Cylinder Rules,* 2004);
b) Accessories fitted to the container (see *Gas Cylinder Rules*, 2004);
c) Vaporizer/pressure regulator;
d) Shut-off valve;
e) Gas injection device or injector or gas mixing piece;
f) Gas dosage unit, either separate or combined with the gas injection device;
g) Flexible hoses;
h) Filling unit (*see* IS 15100);
j) Non-return valve (*see* IS 15100);
k) Gas-tube pressure relief valve;
m) Filter unit;
n) Pressure or temperature sensor;
p) Fuel pump;
q) Service coupling;
r) Electronic control unit;
s) Fuel rail; and
t) Pressure relief device (*see* IS 15100).

3.3 Fuel Pump — A device to establish the supply of liquid LPG to the engine by increasing the pressure of the container with the fuel pump supply pressure.

3.4 Vapourizer — A device intended to vapourize LPG from a liquid to a gaseous state.

3.5 Pressure Regulator — A device intended for reducing and regulating the pressure of liquefied petroleum gas (LPG).

3.6 Shut-off Valve — A device to cut off the flow of LPG.

3.7 Gas-Tube Pressure Relief Valve — A device to prevent the pressure build up in the tubes above a pre-set value.

3.8 Gas Injection Device or Injector or Gas Mixing Piece — A device which establishes the liquid or vapourized LPG to enter the engine.

3.9 Gas Dosage Unit — A device which meters and/or distributes the gas flow to the engine and can be either combined with the gas injection device or separate.

3.10 Electronic Control Unit — A device which controls the LPG demand of the engine and cuts off automatically the power to the shut-off valves of the LPG system in case of a broken fuel supply pipe caused by an accident, or by stalling of the engine.

3.11 Pressure or Temperature Sensor — A device which measures pressure or temperature.

3.12 LPG Filter Unit — A device which filters the LPG, the filter can be integrated in other components.

3.13 Flexible Hoses — Hoses for conveying liquefied petroleum gas in either a liquid or vapour state at various pressures from one point to another.

3.14 Service Coupling — A coupling in the fuel line between the fuel container and the engine. If a mono-fuel vehicle is out of fuel the engine can be operated by means of a service fuel container which can be coupled to the service coupling.

3.15 Fuel Rail — A pipe or duct that connects the fuel injection devices.

3.16 Power Supply Bushing (for Fuel Pump/ Actuator/Fuel Level Sensor) — A gas-tight, insulated, electrical power conductor for components installed inside the container.

4 CLASSIFICATION OF COMPONENTS

LPG components for use in vehicles shall be classified with regard to the maximum operating pressure and function shall be according to Fig. 1.

a) *Class* 1 — High pressure parts including tubes and fittings containing liquid or vapour LPG at vapour pressure or increased vapour pressure up to 3 000 kPa.

b) *Class* 1A — Components having maximum operating pressure up to 2 000 kPa.

c) *Class* 2 — Low pressure parts including tubes and fittings containing vapourized LPG with a maximum operating pressure below 450 kPa and over 20 kPa above atmospheric pressure.

d) *Class* 2A — Low pressure parts for a limited pressure range including tubes and fittings containing vapourized LPG with a maximum operating pressure below 120 kPa and over 20 kPa above atmospheric pressure.

e) *Class* 3 — Shut-off valves and pressure relief valves, when operating in the liquid or vapour phase.

f) *Class* 4 — Components having maximum operating pressure up to 20 kPa.

NOTE — A component can consist of several parts, each part classified in its own class with regard to maximum operating pressure and function.

5 GENERAL REQUIREMENTS

5.1 The specific equipment of vehicles using LPG in their propulsion system shall function in a correct and safe way.

5.2 The materials of the equipment which are in contact with LPG shall be compatible with it.

5.3 Those parts of equipment whose correct and safe functioning is liable to be influenced by LPG, high pressure or vibrations shall be subjected to relevant test procedures described in the relevant standards. In particular the provisions of relevant standards shall be fulfilled.

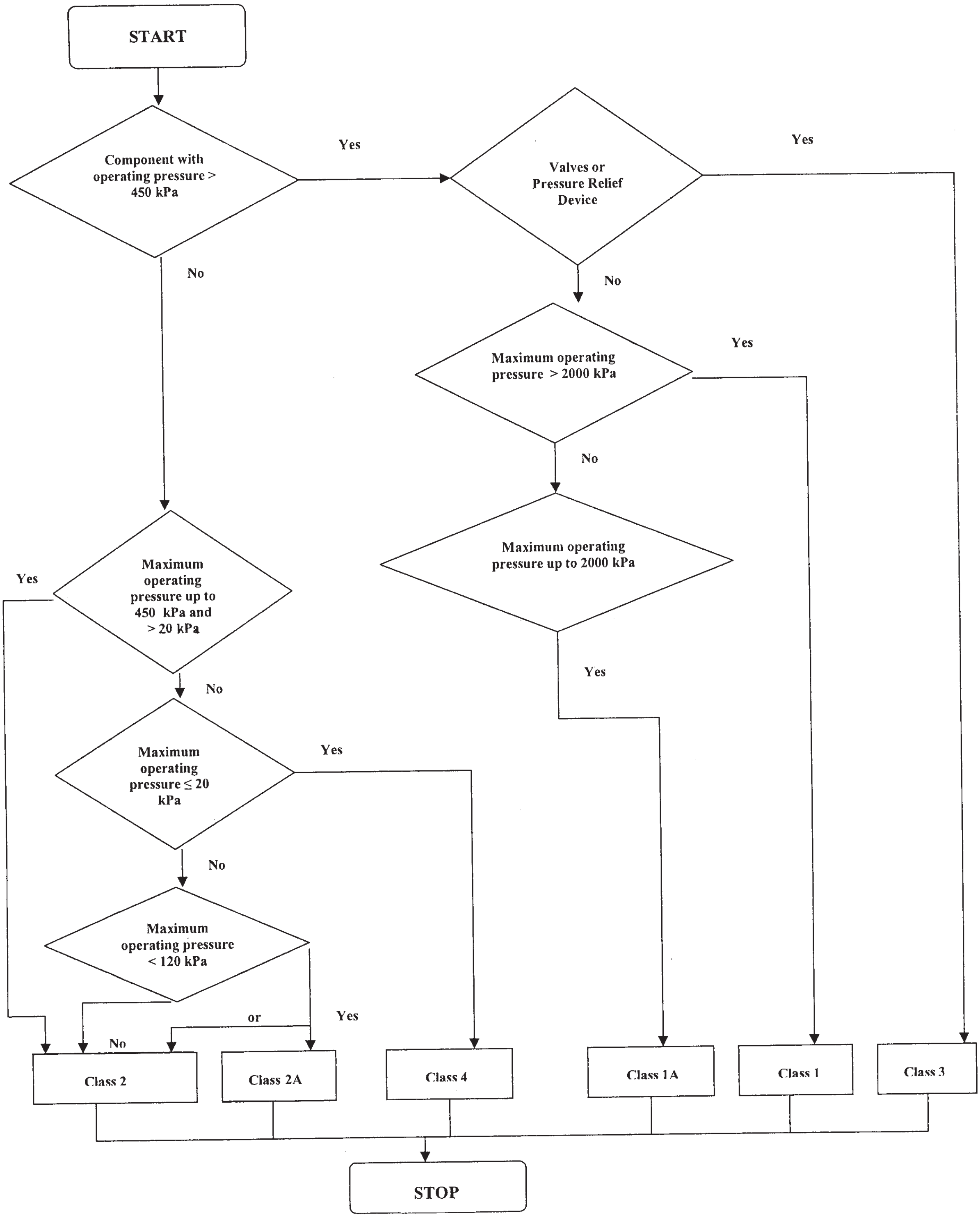
START
Component with operating pressure > 450 kPa
Yes
No
Valves or Pressure Relief Device
Yes
No
Maximum operating pressure > 2000 kPa
Yes
No
Maximum operating pressure up to 2000 kPa
Yes
Maximum operating pressure up to 450 kPa and > 20 kPa
Yes
No
Maximum operating pressure ≤ 20 kPa
Yes
No
Maximum operating pressure < 120 kPa
or
Yes
No
Class 2
Class 2A
Class 4
Class 1A
Class 1
Class 3
STOP

FIG. 1 CLASSIFICATION WITH REGARD TO MAXIMUM OPERATING PRESSURE AND FUNCTION

ANNEX A
(*Foreword*)

COMMITTEE COMPOSITION

Automotive Vehicles Running on Non-conventional Energy Sources Sectional Committee, TED 26

Organization	*Representative(s)*
Automotive Research Association of India, Pune	Shri Shrikant R. Marathe (***Chairman***)
Ashok Leyland Ltd, Chennai	Shri Prassan Deshpande Shri S. Arun (*Alternate*)
Automotive Research Association of India, Pune	Shri M. K. Choudhari Dr S. S. Thipse (*Alternate*)
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Bharat Heavy Electicals Ltd, Bangalore	Shri J. B. D'Souza Shri P. S. Chopra (*Alternate*)
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Central Institute of Road Transport, Pune	Shri S. A. Selvakumar Shrimati Sheeba Rani (*Alternate*)
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International Centre for Automotive Technology (ICAT), Gurgaon	Shri U. K. Bhat Shri S. K. Kalia (*Alternate*)
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Mahindra & Mahindra Ltd, Nasik	Shri Z. A. Mujawar Shri Kiran Mulki (*Alternate*)

Organization	*Representative(s)*
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Ministry of New and Renewable Energy, New Delhi	Director
Petroleum and Explosives Safety Organization, Nagpur	Shri T. R. Thomas Shri C. R. Surendranathan (*Alternate*)
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